

## WHAT IS CLAIMED IS:

## 1. An image recording apparatus comprising:

a recording device for recording an image on a recording medium;

an image signal converting device for converting signal values of a first image signal of the image into signal values of the second image signal to be used for recording by said recording device by employing an image signal converting condition indicative of a relationship between the first image signal and the second image signal;

a density measuring device for reading a test chart image recorded by said recording device by using test chart output image signal values of the second image signal, to acquire measurement density values of the test chart image;

a reference density value selecting device for selecting reference density values corresponding to the measurement density values from a target density data, the target density data indicating a relationship between the first image signal and target density of an image recorded on the recording medium, and having a total data number larger than that of the measurement density values acquired by said density measuring device; and

a converting condition calculating device for calculating target image signal values of the test chart image based upon

the target density data and the reference density values, each of the target image signal values corresponding to each of the measurement density values, and for calculating the image signal converting condition based upon both the target image signal values and the test chart output image signal values, wherein signal values of the first image signal of the image to be recorded are converted into signal values of the second image signal by the image signal converting condition and the image is recorded.

2. The image recording apparatus as claimed in claim 1, wherein:

said reference density value selecting device selects a pair of reference density values corresponding to each of the measurement density values, the pair putting each of the measurement density values therebetween; and

said converting condition calculating device calculates each of the target image signal values based upon a linear interpolation manner by employing the pair of the reference density values.

3. The image recording apparatus as claimed in claim 1, wherein the target density data is set in accordance with a sort of the recording medium.

4. The image recording apparatus as claimed in claim 1, wherein said image recording apparatus further comprises

converting condition storage device for storing therein the image signal converting condition with respect to each of sorts of recording media.

5. The image recording apparatus as claimed in claim 1, wherein:

after the image signal converting condition is set in said image signal converting device,

the test chart image is recorded by said recording device based upon predetermined test chart input image signal values which are converted to the test chart output image signal values at a least by the image signal converting condition set in said image signal converting device, and

respective operations of said image signal converting device, said recording device, said density measuring device, said reference density value selecting device, and said converting condition calculating device are repeatedly carried out by employing the test chart input image signal values, while the image signal converting condition set in said image signal converting device is replaced by the calculated image signal converting condition every time said converting condition calculating device calculates, until the image

signal converting condition which makes a relationship between signal values of the first image signal of the test chart image and the measurement density values of the test chart image substantially coincident with the target density data is found out, whereby a relationship between the first image signal and density of an image to be recorded on the recording medium is substantially made coincident with the target density data.

6. The image recording apparatus as claimed in claim 1, wherein:

the test chart output image signal values are predetermined values; and

the image signal converting condition which is calculated by said converting condition calculating device by employing the test chart output image signal values is set to said image signal converting device.

7. The image recording apparatus as claimed in claim 1 wherein:

said image recording apparatus further comprises:

judging device for judging as to whether or not the measurement density values of the test chart image satisfy an error condition; and

default setting device for default-setting the image signal converting condition in accordance with a judgement result of said judging device.

8. The image recording apparatus as claimed in claim 7 wherein said image recording apparatus further comprises notifying device for issuing a notification in accordance with the judgement result.

9. The image recording apparatus as claimed in claim 1 wherein:

the test chart image corresponds to such a test chart image in which a plurality of patch images are arranged along one array direction, and densities of the patch images vary in an order of a patch image arrangement; and

said image recording apparatus further comprises measurement density control device operable in such a manner that when measurement density value of the test chart image does not correspond to the order of the patch image arrangement along the array direction, the measurement density value not corresponding thereto is removed from the measurement density values of the test chart image.

10. The image recording apparatus as claimed in claim 1

wherein the recording medium is a photosensitive material.

11. An image recording method in which signal values of a first image signal are converted into signal values of a second image signal by employing an image signal converting condition indicative of a relationship between the first image signal and the second image signal, and an image is recorded on the recording medium by using signal values of the second image signal, comprising the steps of:

reading a test chart image recorded on the recording medium by using test chart output image signal values of the second image signal, to acquire measurement density values of the test chart image;

selecting reference density values corresponding to the measurement density values from a target density data, the target density data indicating a relationship between the first image signal and target density of an image recorded on the recording medium, and having a total data number larger than that of the measurement density values;

calculating target image signal values of the test chart image based upon the target density data and the reference density values, each of the target image signal values corresponding to each of the measurement density values; and

calculating the image signal converting condition based

upon both the target image signal values and the test chart output image signal values.

12. A calibration system of image recording apparatuses comprising a plurality of image recording apparatuses, and a density measuring apparatus connected via a communication line to said plural image recording apparatuses, wherein each of said image recording apparatus includes:

an image signal converting device for converting signal values of a first image signal into signal values of a second image signal to be used for recording on a recording medium by employing an image signal converting condition indicative of a relationship between the first image signal and the second image signal;

a recording device for recording an image on a recording medium by using signal values of the second image signal into which signal values of the first image signal are converted by said image signal converting device;

a communication device for receiving density measurement values of a test chart image which is recorded by said recording device from test chart output image signal values of the second image signal and supplied to said density measuring apparatus and measured by said density measuring apparatus;

a reference density value selecting device for selecting

reference density values corresponding to the measurement density values from a target density data, the target density data indicating a relationship between the first image signal and target density of an image recorded on the recording medium, and having a total data number larger than that of the measurement density values acquired by said density measuring device; and

a converting condition calculating device for calculating target image signal values of the test chart image based upon the target density data and the reference density values, each of the target image signal values corresponding to each of the measurement density values, and for calculating the image signal converting condition based upon both the target image signal values and the test chart output image signal values; and wherein:

said density measuring apparatus includes:

density measuring device for measuring densities of the test chart image supplied from each of image recording apparatuses to acquire measurement density values; and

communication device for transmitting the measurement density values acquired by said density measuring device to said image recording apparatus in which the test chart image is recorded.